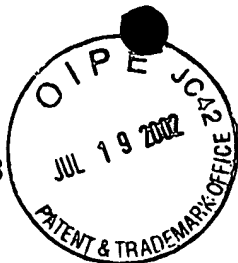


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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
PATENT EXAMINING OPERATION

Applicants : Nicholas Guy Clarke and
Ernest Kenneth Hammond

Application No. : 10/043,831

Confirmation No. : 1167

Filed : January 11, 2002

Invention : DOORS

Group Art Unit : 3634

Examiner :

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Commissioner for Patents
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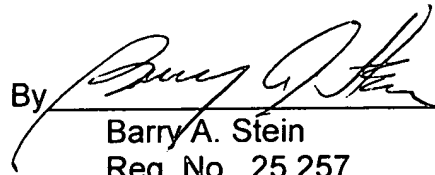
Sir:

I enclose herewith certified copies of GB 0100759.0 filed on January 11, 2001 and GB 0123575.3 filed on October 1, 2001, from which priority is claimed for the above-identified application.

Respectfully submitted,
CAESAR, RIVISE, BERNSTEIN,
COHEN & POKOTILOW, LTD.

July 12, 2002

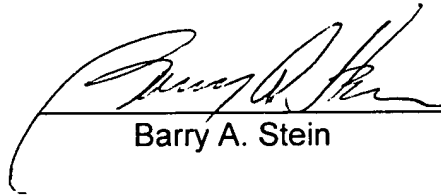
By


Barry A. Stein
Reg. No. 25,257
12th Floor, Seven Penn Center
1635 Market Street
Philadelphia, PA 19103-2212
(215) 567-2010
Attorneys for Applicants

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CERTIFICATE OF MAILING

I hereby certify that the foregoing TRANSMITTAL OF CERTIFIED COPIES, and certified copies of British Patent Application Nos. GB 0100759.0 and GB 0123575.3, re U.S. Application Serial No. 10/043,831, are being deposited with the United States Postal Service as First Class Mail, postage prepaid, in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231, this 12th day of July, 2002.


Barry A. Stein

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INVESTOR IN PEOPLE

The Patent Office
Concept House
Cardiff Road
Newport
South Wales
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CERTIFIED COPY OF PRIORITY DOCUMENT

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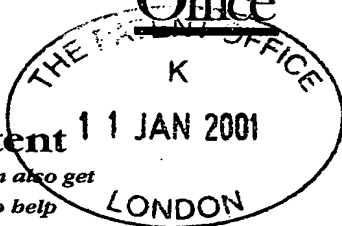
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The Patent Office

Cardiff Road
Newport
Gwent NP9 1RH

1. Your reference

P03028GB

2. Patent application number

(The Patent Office will fill in this part)

0100759.0

3. Full name, address and postcode of the or of each applicant *(underline all surnames)*

POLYMER ENGINEERING LTD
Quakers Coppice
Crewe Gates Farm Industrial Estate
Crewe
Cheshire CW1 6FA
England

Patents ADP number *(if you know it)*

If the applicant is a corporate body, give the country/state of its incorporation

GB

7953516001

4. Title of the invention

DOORS

5. Name of your agent *(if you have one)*

"Address for service" in the United Kingdom to which all correspondence should be sent *(including the postcode)*

LAURENCE SHAW & ASSOCIATES
5th Floor, Metropolitan House
1 Hagley Road, Edgbaston
Birmingham B16 8TG

Patents ADP number *(if you know it)*

1362300

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and *(if you know it)* the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? *(Answer 'Yes' if:*

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
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- See note (d))

Yes

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Description

4

Claim(s)

1

Abstract

1

Drawing(s)

1 + 1

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Priority documents

Translations of priority documents

Statement of inventorship and right to grant of a patent (Patents Form 7/77)

Request for preliminary examination and search (Patents Form 9/77)

Request for substantive examination (Patents Form 10/77)

Any other documents (please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

LAURENCE SHAW & ASSOCIATES

Date

Jan 10, 2001

12. Name and daytime telephone number of person to contact in the United Kingdom

Laurence Shaw

0121 454 4962

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Agents ref: P03028GB

DOORS

The invention relates to a door. A modern door typically comprises a framework, generally rectangular as seen in elevation, the front (or outer) and rear (or inner) faces of which are covered by panels. The panels may have recesses for glass panes, letter boxes and the like. The outer vertical edges of the door may have seals to exclude draughts in gaps between the door and the housing in which it is received.

In one aspect the invention provides a door comprising a framework, panels being secured to the front and rear faces of the framework leaving the edges of the framework exposed, the framework being formed of a synthetic material having a low coefficient of thermal expansion.

Preferably the framework is formed of a thermoset material.

Preferably the framework comprises lengths of set thermoset resin in which elongate fibres are embedded. Preferably the lengths have been formed by pultrusion and the fibres extend continuously along the lengths.

Preferably the door is an external door of a private or public building.

Preferably sealing bars are present at the hinge side of the door to face the frame and a bolt or catch is present at the other side.

In another aspect the invention provides a framework for a door as just described and comprising four lengths to be arranged in sides to form a generally rectangular frame, the lengths comprising pultruded thermoset resin containing elongate fibres.

Pultrusion is a process by which continuous elongate fibres e.g. glass, carbon or aramid, Terylene, Nylon and hemp are impregnated into a thermoset resin and, pulled through a preformer into a heated die. The shape of the end product is determined by the die and the heat causes the resin to polymerise, e.g. cross link. By using pultrusion, one can obtain lengths which can be cut to size and then joined together to form a frame. The lengths have a good strength/weight ratio. Because the frame lengths can be pultruded of thermoset material which has a low coefficient efficient of thermal expansion, if the panels are made of a material having the same property, one can have a door the components of which will have a substantially uniform coefficient of thermal expansion. If the housing to receive the door is made of the same plastics then the entire assembly will expand and contract over temperature extremes at a uniform rate.

Suitable thermoset plastics include polyesters, vinylesters, epoxy and phenolic resins; and the like.

The panels may be made in any known way. The panels may be plain white or have a wood-grained effect or be pigmented or stained.

Typically the door will have an infill which will have cavities to accept items of door furniture such as locks, letter boxes and the like. It is an advantageous feature of the

invention that the infill is made of a material which has a density in excess of about 180 kg/cm³. The density can be higher, say about 800 kg/cm³ and will typically be of the order of 300 to 400 kg/cm³. The cavities may be cut in such high density material to receive letter boxes and the like. The infill may be made by a foaming a plastics such as a polyurethane or phenolic resin.

In order that the invention may be well understood it will now be described by way of example only with reference to the accompanying diagrammatic drawings in which:

Figure 1 is an elevation of the framework of a frame of the invention, and

Figure 2 is a horizontal cross section taken on lines II-II.

The door comprises a framework made up of four lengths L having similar cross sectional shape. The framework comprises two uprights or stiles 1, a bottom horizontal rail 2 and an upper horizontal rail 3. The lengths are joined at the corners of the frame for example by interlocking parts, welding and/or adhesive. Each length is made by pultruding continuous glass fibre lengths in a polyester composition into the cross sectional shape shown in Figure 2. The pultrusion is carried out in the known way. It will be seen from Figure 2 that the lengths have a generally rectangular cross section with two extensions 4 at one side which form sealing bars. The section has a particularly thin wall thickness and is free of reinforcement e.g. a metal extrusion.

The front and rear faces of the door are covered by panels 5 which are bonded to the door framework so as to leave the edges 6 of the frame exposed. The panels may be made of PVCu, preformed GRPv fibreboards or similar materials.

The door can have the usual modifications, e.g. for glass, letter box, catch, or the like, and may be infilled with solid high density polyurethane or phenolic foam or the like.

The use of pultruded lengths in the framework is particularly advantageous because a thermoset material such as polyester has a low coefficient of thermal expansion. As a result the door of the invention when used as an external door will not change in dimensions significantly irrespective of the ambient conditions. Cracking and delamination is avoided.

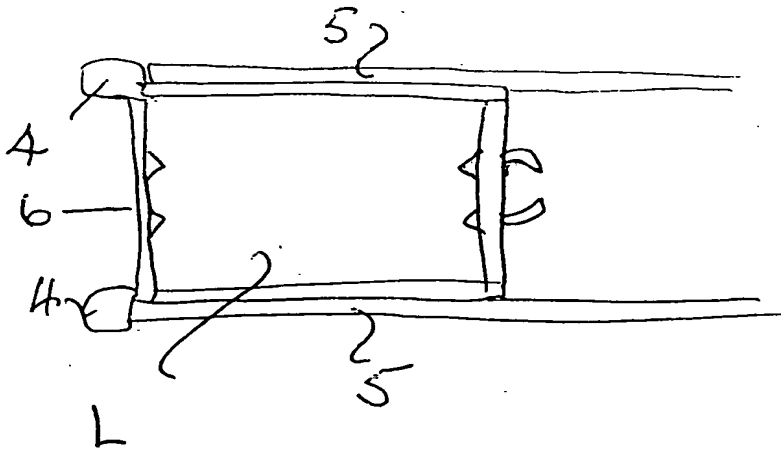
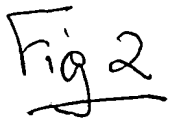
CLAIMS

1. A door comprising a framework, side panels secured to the front and rear faces of the framework leaving the edges of the framework exposed, the framework and being formed of a synthetic material having a low coefficient of thermal expansion.
2. A door according to Claim 1, wherein the framework is formed of a thermoset material.
3. A door according to Claim 1 or 2, wherein the framework comprises sides formed of lengths comprising elongate fibres embedded in a set resin.
4. A door according to Claim 3, wherein the set resin is a polyester.
5. A door according to Claim 3 or 4, wherein the framework comprises lengths which have been formed by pultrusion.
6. A door according to any preceding Claim, including an infill of a polyurethane or phenolic foam having a density of at least 180 kg/cm^3 .
7. A framework for a door according to any preceding Claim, comprising four sides to form a generally rectangular frame made up of lengths of pultruded thermoset resin.

ABSTRACT

A door comprises a length of pultruded thermoset resin

Fig 1



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